ORIGINAL ARTICLE

Validity, reliability, and factor analysis of Persian version of quality of life questionnaire for irritable bowel syndrome (IBS-QOL-34)

Nasrine Masaeli, Gholam Reza Kheirabadi, Hamid Afshar[1], Hamed Daghaghzadeh[1], Mohammad Reza Maracy, Fatemeh Assadolahi[1], Peiman Adibi[2]

Behavioral Sciences Research Center, [1]Psychosomatic Research Center, Isfahan University of Medical Sciences, [2] Integrative Functional Gastroentrology Research Center, Isfahan, Iran

Background: Quality of life (QOL) improvement is the main objective of treating patients with irritable bowel syndrome (IBS). This study aimed to assess the validity, reliability, and factor analysis of IBS-QOL-34 questionnaire as a common transcultural instrument for Iranian IBS patients. **Materials and Methods:** Two hundred and forty patients with IBS (based on gastroenterologists' diagnosis according to ROM III criteria) were referred to Digestive Health Clinic in Psychosomatic Research Center have been selected in this study. Aside with IBS-QOL-34, MOS 36-item short-form health survey (SF-36) and IBS severity index (IBSSI) questionnaires were completed by the cases for determination of correlation coefficients; the data were analyzed using descriptive statistics, factor analysis, Cronbach's alpha, Pearson correlation coefficient by Statistical Package for Social Sciences (SPSS) software, version 18. **Results:** Total reliability of the questionnaire was reported by using Cronbach's alpha as 0.95, ranging from 0.65 to 0.90. Correlation coefficients of concurrent implementation of IBS-QOL with SF-36 and IBSSI resulted in −0.61 and 0.64, respectively. Exploratory factor analysis using varimax rotation identified eight principle components, which will determine QOL at 67% variance. **Conclusion:** According to the results, IBS-QOL-34 questionnaire has good psychometric properties in the research community and can be safely used as a valid tool to assess QOL of patients with IBS for healthcare and therapeutic purposes.

Key words: Factor analysis, irritable bowel syndrome, quality of life questionnaire, reliability, validity

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INTRODUCTION

Chronic disorder not only causes physical pain for humans, but also have serious effects on quality of life (QOL) of people by affecting their social life and psychological dimensions.[1] Irritable bowel syndrome (IBS) is a prevalent and distressing problem which is diagnosed by symptoms of abdominal pain and discomfort along with disorder in excretion without any organic causes.[2-4] Epidemiologic studies showed the prevalence of this disease around the world has been reported as 10-20% among adults and adolescents and more women than men are affected.[5] Its prevalence rate is 10-15% in western countries and about 6-20% in Iran.[6-8] This syndrome is highly accompanied by mental disorders, particularly depression and anxiety, and can considerably disrupt people's QOL.[9,10] A branch of QOL called health-related quality of life (HRQOL) has recently attracted the attention of researchers and therapists.[11] HRQOL includes patients' perceptions and attitudes towards their life dimensions which are influenced by diseases.[12] There is growing consensus that determining HRQOL should be one of the main components of therapeutic and research efforts. There is no clear and reliable pathology, and the symptoms are not sometimes justifiable and meaningful for the patients in functional digestive disorders. Therefore, it is very important to evaluate HRQOL so as to determine the extent of improvement, treatment progress, and the disruption level to better understand routine physical, mental, and social functioning of people.[12,13] In recent years, researchers and specialists have shown special interest in measuring QOL of IBS patients.[13] Considering the absence of a biologically determining criterion and the controversy between patients and therapists, the most important criterion for determining improvement is to evaluate QOL by the patient himself/herself, which is only possible using the questionnaires with confirmed psychometrics.[13] One of the useful and appropriate instruments for evaluating QOL of this group of patients is IBS-QOL, which was first made by huhen *et al*. It contains 30 items in nine subscales. Afterward, its 34-item questionnaire was made by Patrick *et al*., and was used in England, Germany, Italy, and France based on these countries' cultural conditions. A total of 169 patients with

Address for correspondence: Dr. Gholam Reza Kheirabadi, Behavioral Sciences Research Center, Khorshid Hospital, Ostandari St, Isfahan, Iran.
E-mail: kheirabadi@bsrc.mui.ac.ir
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irritable bowel syndrome filled out this questionnaire during a cross-sectional study. Its construct validity was measured and the correlation coefficient of 0.30-0.40 and 0.27-0.46 was reported with respect to MOS 36-item short-form health survey (SF-36) and symptom checklist-90-revised (SCL90-R) questionnaires, respectively.[14] In 2004, a study was conducted by Donald *et al*., to investigate some psychometric characteristics of this instrument among people with irritable bowel syndrome; the results showed that test reliability using Cronbach's alpha was 0.95. Moreover, correlation coefficient of convergent validity was calculated as 0.45 using Genera Health Questionnaire instrument.[15] In 2007, Huang *et al*., translated this tool based on their cultural criteria in China and studied its psychometric characteristics. The results showed that reliability of the questionnaire was 0.72-0.91 and 0.92 using Cronbach's alpha in different subscales and in retest, respectively. In order to determine its validity, SF-36 was used which showed high correlation coefficients.[16] This instrument was studied by Kanazawa *et al*., (2007) in Japan and the results demonstrated internal correlation of its questions as 0.96 based on Cronbach's alpha and convergence validity of −0.36 using IBS severity index (IBSSI).[17] In 2008, a study was conducted for preliminary investigation of IBS psychometric characteristics by Haghayegh *et al*., in which Cronbach's alpha was reported between 0.57 and 0.93. Also, the mentioned questionnaire had acceptable diagnostic validity.[18] In 2011, Gholamrezaei *et al*., conducted a study on validity and reliability of IBS-QOL; based on the obtained results, Cronbach's alpha was reported as 0.68-0.90 for the whole questionnaire and its subscales and 0.77-0.91 for Internal Correlation Coefficient (ICC). In order to study validity, two instruments of hospital anxiety and depression scale (HADS) and IBS severity scoring Index (IBSSI were used and the correlation coefficients of these instruments with IBS-SSS, anxiety, and depression were reported as −0.62, −0.71, and −0.69, respectively.[19] Since this instrument has been psychometrically studied in other countries and to the best knowledge of the present author, the investigations in Iran have not been completely performed or have been studied with small sample sizes, the researcher intended to study psychometrical characteristics of this instrument in comprehensively (including factor analysis and correlation Coefficients with SF-36 and IBSSI) and with a large sample size. The results of this research can be an evaluation and research guide for healthcare plans and management of patients with IBS and be a pioneer for solving different problems in different life dimensions of these patients.

MATERIAL AND METHODS

The present research was a psychometric study for determining psychometric characteristics of QOL questionnaire in patients with IBS in Isfahan in 2009. The studied population included all patients with IBS who were selected using convenient sampling according to the inclusion criteria of suffering from IBS with the diagnosis of a gastroenterologist and based on Rom III criteria, consent to participate in the study, minimum literacy, and no pregnancy.

Irritable bowel syndrome-quality of life IBS-QOL instrument

This instrument was originally designed by Huhen and had 30 items in nine subscales. Then it was revised by Patrick *et al*., (2000) who included 34 items in a 5-point Likert scale with eight subscales of dysphoria, interference with activity, body image, health worry, food avoidance, social reaction, sexual issues, and relations. The obtained scores range from 0 to 100 and it takes 10 min to complete. Obtaining higher scores in this instrument indicates lower QOL. This instrument has been designed and used in England, France, and Italy according to their cultures. Its construct validity has been reported as r = −0.30 to −0.44 using SF-36 tools and r = −0.27 to −0.46 using SCL90–R.[14] Its reliability is also 0.95 using Cronbach's alpha.[20]

SF-36 questionnaire

This questionnaire was made in 1993 by Ware *et al*., to study general health situation. It contains eight scales of physical functioning, role limitations resulting from problems of physical health, physical pains, person's perception about general health, vitality, social functioning, role limitations resulting from emotional problems, and mental health. This questionnaire is a self-report instrument and obtaining higher scores is the sign of better QoL. Reliability of this instrument has been reported between 0.73 and 0.96; and it can be completed within 10 min.[21]

Irritable bowel syndrome severity index

This questionnaire includes five items and studies symptoms of IBS including pain, defecation disorder, bloating, interference with life activities, and off-intestinal symptoms using IBSSI. Mean score of each item is at most 100 and the total score of questionnaire is at most 500. Mild, average, and severe cases of disease are specified by scores of 75-175, 175-300, and above 300, respectively. Although none of the IBS severity measurement instruments have been thoroughly confirmed, the above-mentioned instrument has been reported as the best one and has been used in most of the similar studies.[22] First, the questionnaire was translated into Persian with a person who was a Persian native with MS degree of English language; then, backward translated to English with another person in the same academic position and matched with original text and again forward translated to Persian. Then, its face and content validities were studied by specialists in this field (a psychiatrist, a psychologist, a gastroenterologist,

and a linguist). The goal of the study and the way it was supposed to be completed were explained to the patients; in the case of interest in participation in the study, IBS-QOL questionnaire and then IBSSI and SF-36 questionnaires were filled out by the participants. Descriptive statistics was used for determining means, Cronbach's alpha was used to determine reliability of the whole questionnaire, its scales and questions and correlation coefficients were used to determine concurrent validity (in addition to face and content validity) of the instrument. Also, exploratory factor analysis and varimax rotation were used to analyze the factors. Finally, all the information was analyzed using Statistical Package for Social Sciences (SPSS) software, version 18.

RESULTS

Demographic characteristics

Two hundred and twenty-two patients with IBS with the mean age of 38.61 ± 12.27 filled out IBS-QOL questionnaire. Sixty-five patients (28.9%) were male and 160 patients (71.1%) were female. Forty-one patients (18.2%) were single, 180 patients (80%) were married, and patients (1.8%) were divorced. Mean and standard deviation (SD) of the total score of QOL in the patients with IBS was 43.37 ± 20.74.

Reliability

Total reliability of the questionnaire and its subscales was studied using Cronbach's alpha and its results are presented in Table 1.

Table 1: Total reliability of IBS-QOL questionnaire and its subscales

IBS-QOL	Number of questions	Cronbach's alpha
Total questionnaire	34	0.95
Dysphoria	9	0.90
Interference with activity	5	0.72
Interpersonal relations	9	0.65
Food avoidance	3	0.72
Social reaction	2	0.74
Sexual concerns	2	0.69
Body image	2	0.85
Health worry	2	0.80

IBS-QOL=Irritable bowel syndrome-quality of life

Table 2: Correlation coefficients of IBS-QOL with SF-36 and its scales

SF-36	Correlation coefficients
Total score of SF-36	−0.61
Physical functioning	−0.37
Limitations resulting from problems of physical health	−0.44
Limitations resulting from mental health	−0.40
Energy fatigue	−0.49
Mental health	−0.52
Social functioning	−0.42
Pain	−0.59
General health	−0.51

IBS-QOL=Irritable bowel syndrome-quality of life; SF-36=MOS 36-item short-form health survey

Table 3: Correlation coefficients irritable bowel syndrome-quality of life with IBS severity index and its scales

IBSSI	Correlation coefficient	Significance level
Total score of IBSSI	0.46	$P<0.001$
Pain severity	0.34	$P<0.001$
Pain duration	0.22	$P<0.001$
Bloated stomach	0.25	$P<0.001$
Defecation	0.14	$P=0.031$
General life functioning	0.49	$P<0.001$

IBSSI=IBS severity index; IBS: Irritable bowel syndrome

Validity

Content validity

While translating the questionnaire, attempts were made to translate the questions in a way to be understandable for the patients from different classes. Also, based on the views of specialists; all the subscales, problems, limitations, (physical-mental) effects, and (personal-social) concerns of the patients were reflected in this instrument.

Concurrent validity

In order to determine concurrent validity; IBS-QOL questionnaire, SF-36 questionnaire, and IBSSI were filled out by the participants. The results of correlation coefficients of IBS-QOL with SF-36 and IBSSI are reported in Tables 2 and 3.

Based on the results of the above table, a statistically significant and reverse relationship was found between these two instruments ($P < 0.001$).

Based on the results of the above table, there was statistically significant and direct correlation between these two instruments. In order to determine factors of IBS-QOL questionnaire, exploratory factor analysis was used. Before performing the analysis method, KMO criteria factors were studied to determine the justifiability of performing factors analysis on this questionnaire, the estimation of which was 0.935 and indicated the sample's efficiency and justifiability of factor analysis [Table 4].

Exploratory factor analysis identified eight main factors using varimax rotation and by excluding items with factor loading of below 0.3, which included 1-first factor: Dysphoria (1, 6, 7, 8, 9, 10, 13, 16, 30); 2-second factor: Interference with activity (27, 29, 31,32, 33); 3-third factor: Interpersonal relations (14, 17, 18, 19, 22, 25, 24, 26, 34); 4-fourth factor: Food avoidance (11, 23, 28); 5-fifth factor: Social reaction (2, 3); 6-sixth factor: Sexual concerns (12, 20);

Table 4: Factor loadings of irritable bowel syndrome-quality of life questionnaire in eight obtained factors

Questions	Components							
	Dysphoria	Interference in activity	Interpersonal relations	Food avoidance	Social reaction	Sexual concerns	Body image	Concerns with health
1	0.52							
2					0.65			
3					0.74			
4								0.61
5							0.77	
6	0.72							
7	0.76							
8	0.66							
9	0.73							
10	0.65							
11				0.79				
12						0.81		
13	0.51							
14			0.42					
15								0.65
16	0.54							
17			0.70					
18			0.71					
19			0.43					
20						0.81		
21							0.75	
22								
23				0.81				
24			0.47					
25			0.37					
26			0.50					
27		0.57						
28				0.43				
29		0.56						
30	0.52							
31		0.85						
32		0.83						
33		0.60						
34			0.46					

7-seventh factor: Body image (5, 21); and 8-eighth factor: Health worry (4, 15); and explained 67% of the common variance of QOL.

DISCUSSION AND CONCLUSION

HRQOL of life indicates physical, psychological, and social functions of people in response to diseases and treatment. IBS-QOL-34 questionnaire is an instrument for measuring QOL in patients with IBS. The findings of the present study confirmed psychometric characteristics of this instrument in a sample from Iranian population. Total reliability of IBS-QOL-34 questionnaire was calculated as 0.95 using Cronbach's alpha and it was 0.65-0.90 for its subscales. Park *et al.*, determined total reliability of IBS-QOL-34 questionnaire and its subscales as 0.97 and between 0.69 and 0.97 by Cronbach's alpha, respectively. Kanzawa *et al.*, obtained the total reliability of IBS-QOL-34 questionnaire as 0.96 and that of its subscales from 0.48 to 0.94. Gholamrezaei *et al.*, reported its total reliability and that of subscales via Cronbach's alpha as 0.94 and between 0.68 and 0.90, respectively.[19] These results were congruent with the present study and test users can trust the instrument in terms of decision-making and interpretation of results. In order to study concurrent validity; IBS-QOL-34, IBSSI, and SF-36 questionnaires were filled out by the participants. The correlation coefficient between IBS-QOL-34 questionnaire and IBSSI was 0.46, which indicated significant and direct relationship in this group of patients. Kanazawa *et al.*, reported this coefficient as −0.36, which was in line with the present study and can be attributed to using similar instruments.[17] Gholamrezaei *et al.*, applied IBS-SSS and reported this coefficient as −0.62,[19] which was in parallel with the results of this study and might be related to using

different instruments for determining this coefficient. The results related to factor analysis of IBS-QOL-34 confirmed the presence of eight factors of dysphoria, interference in activity, interpersonal relations, food avoidance, social reaction, sexual concerns, body image, and concerns with health; with 67% of common variance in addition to the total factor of QOL. This study was congruent with a preliminary study in 1998[14] and the investigation by Park *et al*.,[22] in terms of the number of obtained factors; however, some questions were displaced in the subscales, which can be justified by cultural reasons. Considering the obtained results, this questionnaire can be used as a useful instrument for studying QOL in patients with IBS in treatment centers and can be applied in a class of psychiatric studies on patients with IBS. The results of this research can be generalized to the population within the inclusion criteria, not the people within the exclusion criteria. Also; the research was limitation to Functional Gastro Intestinal Clinic, Isfahan Psychosomatic Research Center; constraints its generalizability to other populations. Therefore, authors are suggested to conduct similar studies in different statistical populations and different cities of Iran.

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